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The United States and Japan's Semiconductor Supply Chain Diversification Efforts Should Include Southeast Asia

By Jeffrey Bean

Responding to oncoming U.S.-China commercial friction in recent years, firms operating in the complex, dense semiconductor ecosystem centered on the United States and Northeast Asia began a gradual evaluation of whether and how to reshape their supply chains and investments, and still maximize profit. As a foundational industry for maintaining economic competitiveness and national security, semiconductors serve as a keystone in U.S. and Japanese technological leadership. Against the backdrop of nascent U.S.-China technology competition and the standstill from the coronavirus, adjustments to enhance resiliency and mitigate disruption through developing semiconductor supply chains and investments outside of China, including in Southeast Asia, should be supported.

Jeffrey Bean, East-West Center in Washington Visiting Fellow, explains that "Adjustments to enhance resiliency and mitigate disruption through developing semiconductor supply chains and investments outside of China, including in Southeast Asia, should be supported."

The Japanese government's April 8, 2020, announcement that it will support Japanese corporations in shifting operations out of China and reducing dependency on Chinese inputs reflects this impulse. While impressive sounding, the $2.2 billion Japan allocated as part of its larger stimulus package to counter the headwinds of the coronavirus, is a mere drop in the bucket for the semiconductor industry of what would be an immense cost to totally shift operations and supply chains out of China. Semiconductor manufacturing is among the most capital-intensive industries in the global economy. Moreover, costs within Japan to "bring manufacturing back" are very high. Despite this – while Japan is not the super power it once was in semiconductors – it still has cards to play.

Concurrently, officials in the United States, through a combination of concerns over security and lack of supply chain redundancy, are also pushing for new investments to locate a cutting-edge fabrication facility in the continental U.S. One idea is to build a new foundry operated by Taiwanese pure-play giant TSMC. The Trump administration is considering other incentives to increase attractiveness for companies to invest in new front-end facilities in the United States, to maintain the U.S. dominant position in the industry and secure supply for military applications. Global semiconductor companies may be reluctant. After all, investments, facilities, and the support eco-system in China are in place, and revenues from the Chinese market enable U.S. semiconductor firms to reinvest in the research and development that allows them to maintain their market lead. And in the United States, there may be limits on the pool of human capital to rapidly absorb extensive new advanced manufacturing capacity.

But there are two factors in a geopolitical vise closing at unequal speed on companies in the industry that will increase supply chain disruption: China's own semiconductor efforts and U.S.-Japanese export controls. As part of the Made in China 2025 industrial policy initiative, General Secretary Xi Jinping and Chinese Communist Party leadership have tripled down to overcome past failures in Chinese efforts to develop indigenous semiconductor manufacturing capability. Following penalties brought by the U.S. Department of Commerce against ZTE and then Huawei, the Chinese leadership's resolve to reduce its dependence on U.S. semiconductors has crystalized. The Chinese government intends to halve U.S. sourced semiconductor imports by 2025 and be totally independent of U.S. chips by 2030. And while behind in many areas and accounting for the usual state-directed stumbles, Chinese companies have

made some progress in designing AI chips and at the lower end of the memory storage market. Even if the overall goals may prove unattainable, firms should heed the writing on the wall – China only wants to buy U.S. chips for the short term and as soon as possible end all foreign dependence.

Leaders in the United States and Japan are also crafting some of their first salvos in what is likely to be a generation-long competition over technology and the future of the regional economic order with China. The Trump administration, acting on a bipartisan impetus after years of Chinese IP theft and recognizing mounting hardware security concerns, has begun planning to implement additional export controls directed at Chinese companies and certain chips. Japan and the United States have also reportedly initiated dialogue about coordinating export controls in the area of semiconductor manufacturing equipment.

Collectively, these policies will be highly disruptive to semiconductor value chains and downstream technology companies like Apple and NEC, which are dependent on these networks to maintain a cadence of new products every 18-24 months. Japan's action to place export controls on critical chemical inputs for South Korean semiconductor firms in the summer of 2019 serves as a warning of the supply chain's vulnerability to miscalculated policy. In short, Washington and Tokyo must tread carefully. Without support from other key actors like South Korea, Taiwan, and the Netherlands, and by failing to incorporate industry input, poorly calibrated export controls on semiconductors could severely damage U.S. and Japanese companies' competitiveness.

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A third course out of the bind for semiconductor firms may be available: a combination of on-shoring, staying in China, and relocation. For semiconductor companies, the relocation portion will not happen overnight. Shifting supply chains takes time for a capital-intensive industry driven by know-how that has limited redundancy. Destinations worth exploring from both cost and security perspectives as alternatives to China include South and Southeast Asia. Specific ASEAN countries, namely Vietnam, Malaysia, Thailand, and Singapore, offer good prospects for investment. There is an existing industry presence in several locations in the region. Multinational firms already operating in Malaysia, Thailand, and Vietnam have benefited from diversification during the ongoing U.S.-China trade war, but are still dependent on Chinese inputs. Shifting low-value operations to Southeast Asia, such as systems integration, could likely be done relatively quickly – and some firms have – but shifting or adding additional high-value nodes such as back-end (assembly, packaging, and testing) facilities to the region will require incentives and support. At a minimum, a dedicated, coordinated effort on the part of the United States and Japan is essential to improve the investment environment.

How can the United States and Japan help? Programs and initiatives are needed to address myriad weaknesses in Southeast Asia. Semiconductor manufacturing requires robust infrastructure, for example stable electricity supply, deep logistical networks, a large talent pool of engineers and STEM workers, and a technology ecosystem that includes startups and small or medium enterprises to fill gaps and provide innovations. The United State and Japan can fund high quality infrastructure, frame curriculum for semiconductor industry training through public-private partnerships, and help build capacity in logistical, regulatory, and judiciary systems.

The burden in many of these areas will fall on specific Southeast Asian governments themselves, but the United States and Japan should assist. Effectively diversifying the regional technology supply chain to mitigate the impact of pending and future shocks may depend on it.

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